CLAIM AMENDMENTS

IN THE CLAIMS

This listing of the claims will replace all prior versions, and listing, of claims in the application or previous response to office action:

1. (Currently Amended) A method of treating the NOx emissions from a diesel engine having at least one internal combustion chamber for combusting diesel fuel, a main fuel line that carries diesel fuel to the engine, and a main exhaust line that carries exhaust from the engine, the exhaust having a range of exhaust gas temperatures typical for a vehicular diesel engine, the method comprising:

providing an auxiliary fuel line from the engine's diesel fuel supply source, separate from the main fuel line;

introducing air, via an air intake line, into the auxiliary fuel line, thereby mixing fuel in the auxiliary fuel line with air;

receiving the mixed portion of diesel fuel and air into a partial oxidation unit located external to the internal combustion chamber and off-line the main exhaust line;

wherein the partial oxidation unit has at least a heat generating means;

using the partial oxidation unit to receive air via the air intake line, to receive diesel fuel via the auxiliary fuel line, and to at least partially oxidize diesel fuel into a gas mixture containing hydrogen;

delivering the gas mixture to the main exhaust line;

placing a ruthenium-based hydrogen selective catalytic reduction (H-SCR) unit in-line on the main exhaust line, such that the H-SCR unit receives the exhaust and the gas mixture; and

using the H-SCR unit to continuously convert NOx emissions to nitrogen;

wherein the H-SCR unit is further operable to reduce the NOx emissions to nitrogen during diesel operating temperatures under the range of exhaust gas temperatures;

determining the ~~ratio~~ separate amounts of ~~No to~~ NO and NO2 in the exhaust; and

metering the hydrogen delivered to the H-SCR unit to maintain a ratio of the hydrogen to NOx in the main exhaust line, on the basis of: ~~the ratio of NO to NO2, a substantially 1:1 molar~~ a desired ratio of hydrogen to NO, and a ~~substantially 2:1 molar~~ desired ratio of ~~the~~ hydrogen to NO2.

2. (Original) The method of Claim 1, wherein the partial oxidation unit is a non-stoichiometric burner.

3. (Previously Presented) The method of Claim 1, wherein the partial oxidation unit has a catalyst.

4. (Previously Presented) The method of Claim 3, wherein the partial oxidation unit is a nickel-based catalyst.

5. (Previously Presented) The method of Claim 3, wherein the partial oxidation unit is a rhodium-based catalyst.

6. (Original) The method of Claim 1, wherein the partial oxidation unit is a combination of a non-stoichiometric burner and a catalyst.

7. (Cancelled)

8. (Cancelled)

9. (Original) The method of Claim 1, further comprising the step of using a water gas shift catalyst to receive the gas mixture from the partial oxidation unit and to generate additional hydrogen in the gas mixture.

10. (Currently Amended) A method of treating the NOx emissions from a diesel engine having at least one internal combustion chamber for combusting diesel fuel, a main fuel line that carries diesel fuel to the engine, and a main exhaust line that carries exhaust from the engine, the exhaust having a range of exhaust gas temperatures typical for a vehicular diesel engine, the method comprising:

providing an auxiliary fuel line from the engine's diesel fuel supply source, separate from the main fuel line;

receiving, via the auxiliary fuel line, a portion of diesel fuel from the main fuel line into a partial oxidation unit;

receiving, via an exhaust gas intake line, a portion of the exhaust from the main exhaust line into the partial oxidation unit;

wherein the partial oxidation unit is located external to the internal combustion chamber and off-line the main exhaust line;

using the partial oxidation unit to receive the portion of the exhaust via the exhaust gas intake line, to receive diesel fuel via the auxiliary fuel line, and to at least partially oxidize diesel fuel into a gas mixture containing hydrogen;

delivering the gas mixture to the main exhaust line;

placing a ruthenium-based hydrogen selective catalytic reduction (H-SCR) unit in line on the main exhaust line, such that the H-SCR unit receives the exhaust and the gas mixture, and;

using the H-SCR unit to continuously convert the NOx emissions into nitrogen;

wherein the H-SCR unit is further operable to reduce the NOx emissions to nitrogen during diesel operating temperatures under the range of exhaust gas temperatures;

determining the ~~ratio~~ separate amounts of ~~No to~~ NO and NO2 in the exhaust; and

metering the hydrogen delivered to the H-SCR unit to maintain a ratio of the hydrogen to NOx in the main exhaust line, on the basis of: ~~the ratio of NO to NO2, a substantially 1:1 molar~~ desired ratio of hydrogen to NO, and a ~~substantially 2:1 molar~~ desired ratio of ~~the~~ hydrogen to NO2.

11. (Original) The method of Claim 10, wherein the partial oxidation unit is a non-stoichiometric burner.

12. (Previously Presented) The method of Claim 10, wherein the partial oxidation unit has a catalyst.

13. (Previously Presented) The method of Claim 12, wherein the partial oxidation unit is a nickel-based catalyst.

14. (Previously Presented) The method of Claim 12, wherein the partial oxidation unit is a rhodium-based catalyst.

15. (Original) The method of Claim 10, wherein the partial oxidation unit is a combination of a non-stoichiometric burner and a catalyst.

16. (Cancelled)

17. (Cancelled)

18. (Original) The method of Claim 10, further comprising the step of using a water gas shift catalyst to receive the gas mixture from the partial oxidation unit and to generate additional hydrogen in the gas mixture.